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Alberta Agricultural Research Institute

Annual Report

1991 - 1992

Alberta

Alberta Agricultural Research Institute Annual Report 1991-92

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Alberta Agricultural Research Institute Annual Report

1991-92

To the Honourable Ernie Isley
Minister of Agriculture and Rural Development

In accordance with the requirements of the Alberta Agricultural Research Institute Act, I have the honour to present to you the Annual Report of the Alberta Agricultural Research Institute. The report covers the fiscal year April 1, 1991 to March 31, 1992.

Respectfully submitted,

Bob Bogle

Bob Bogle, MLA
Chairman
Board of Directors

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Chairman's Report

I am pleased to present the annual report of the Alberta Agricultural Research Institute (AARI) for the fiscal year April 1, 1991 to March 31, 1992. This marked the first complete fiscal year in which Farming for the Future was administered as an Institute program. The addition of this highly successful research and technology transfer program consolidated AARI's position as Alberta's primary agricultural research co-ordinating, promoting and funding agency.

Readers of the Farming for the Future Progress Report will notice its incorporation into AARI's annual report. The Farming for the Future merger on April 1, 1991 strengthened the Institute's capability to deliver its mandate of co-ordinating and funding research and technology transfer in support of a viable and sustainable agri-food industry in Alberta. We have also benefited from the expertise of former Farming for the Future Council members - Ben McEwen, Ed Tyrchniewicz, Gail Fjordbotten, Jim Hole and Ben Schrader - currently serving on the Institute's Board of Directors.

In addition to the major program expansion, the past year was highlighted by the Board's adoption of a five-year strategic plan for the Institute. We are now working with a clear set of goals and priorities to the year 1997. These strategies were created with the objective that they will contribute to launching our agricultural industry into the next century as a world-class leader.

The Institute is proud of its accomplishments in the past year. We look forward to many more success stories in the upcoming years. With a team approach to agricultural research needs and priorities, we will meet the challenges of the future together.

I wish to express my sincere appreciation to all members of the Board of Directors, members of Institute committees, and to Dr. Ralph Christian and the staff of Alberta Agriculture's Research Division for their efforts during the past year. A special thanks to one of our producer directors, Mr. Bill Devereux, who resigned during the past year. I look forward to another equally exciting and rewarding year for the Alberta Agricultural Research Institute.

Bob Bogle

Bob Bogle, MLA
Chairman
Board of Directors

Executive Director's Report

The past year was challenging and exciting for the Alberta Agricultural Research Institute. It was also somewhat of a transitional period. For the Matching Grants and Research Co-ordination Programs, administrative changes were made to align their funding periods with the Farming for the Future Research Program. Funding is now provided on the government fiscal year basis. The research proposal deadline for all three programs is November 1. This transition was completed in an efficient manner and resulted in a more co-ordinated proposal review process.

During the past fiscal year, the Institute worked towards and achieved many of its goals in the research areas of agricultural production, processing and marketing, resource conservation and technology transfer. As you will read in **Research Highlights**, an impressive array of research and technology transfer projects were completed, continued and initiated in 1991-92. To promote and co-ordinate agricultural research activities, considerable liaison was also conducted with the federal government, provincial agencies, academia and private sector groups.

The addition of Farming for the Future's research and on-farm demonstration programs injected diversity into the overall structure of the Institute. With eight research and technology transfer programs now under the Institute's administration, we are in a better position to carry out its five-year strategic plan.

Dramatic changes have occurred in the food and agriculture industry, domestically and globally. Embracing these changes in a competitive fashion relies, in part, on co-ordinated, high priority research and technology transfer. With this premise in mind, the Alberta Agricultural Research Institute developed a number of goals in its strategic plan. They include research and technology transfer directed at: agricultural diversification; improving food quality, safety and nutrition; better information on agricultural policy, economics and marketing; increasing private sector participation; appropriate use of biotechnology; and elevating public awareness of the role of research in agriculture.

We are fortunate to live in a province rich in the natural and intellectual resources required to produce a wide range of agricultural products. Alberta is a leading province in many agricultural products and services. Although this would not be possible without adequate natural resources, it is the human resource that largely defines the past and future success of our industry.

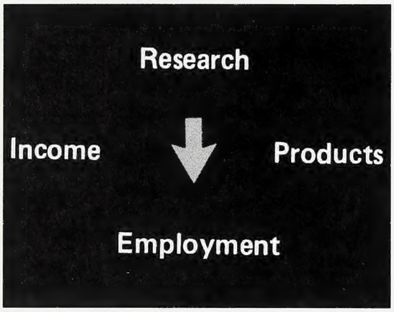
A strong spirit of teamwork, co-ordination and co-operation prevails among researchers, producers, processors, extension personnel and many others involved in programs administered by the Institute. This co-operative effort is an extension of the teamwork within our agricultural community. With this spirit, and the able guidance of our Board of Directors, I am confident that the Alberta Agricultural Research Institute will be a valued contributor to the partnership forging a successful future for agriculture in Alberta.

R.G. Christian, DVM
Executive Director

Introduction

The Alberta Agricultural Research Institute is a provincial Crown corporation. Created by the Legislative Assembly of Alberta in 1987, the Institute was formed to co-ordinate, promote and support agricultural research. Empowered by the Alberta Agricultural Research Institute Act, the Institute's activities are governed by a Board of Directors appointed by the Associate Minister of Agriculture.

In 1991, the Institute underwent significant organizational restructuring. This resulted from the Farming for the Future merger. Also in 1991, the Institute assumed the research related function of the former Alberta Agricultural Co-ordinating Committee. These two developments contributed to AARI's position as Alberta's primary agricultural research funding and co-ordinating agency.



Since its beginning in 1979, Farming for the Future has made tremendous contributions, not only to the advancement of agricultural research and training of new scientists, but also to job creation and the profitability of Alberta's agricultural industry. In 1991, Dr. Travis W. Manning, Professor Emeritus at the University of Alberta's Department of Rural Economy, conducted a project, "Evaluation of Alberta Agriculture's Farming for the Future Program." Dr. Manning estimated the value of benefits resulting from the Farming for the Future Program would be $939 million over a 25-year period.

A more recent evaluation of the Farming for the Future Program was done by Serecon Consultants of Edmonton. Unlike Dr. Manning's study, which was based on a general analysis of the Program, Serecon examined individual research and on-farm demonstration projects. Serecon concurred with Dr. Manning's view that his estimate of benefits was conservative.

Serecon studied the economic return to Alberta's agri-food industry of ten research and ten on-farm demonstration projects. The consultants estimated a direct gross economic return of $455.6 million from these 20 projects alone. This figure was based on financial analysis of data, file reviews and expert interviews with researchers, extension personnel, farm co-operators and end-users. According to Serecon, the economic benefit to Alberta of these 20 projects alone would far exceed the total cost of the Farming for the Future Program since 1979! The total cost of 1,500 research and demonstration projects funded between 1979 and March 31, 1992 was $77.3 million (1992 dollars).

The Alberta Agricultural Research Institute's mission statement is to co-ordinate, promote, priorize and support agricultural research, ensuring transfer of the resulting knowledge for the benefit of a viable and sustainable agri-food industry. The addition of the Farming for the Future Program has greatly enhanced the Institute's ability to achieve its mission.

Organization

The Alberta Agricultural Research Institute's organizational structure is shown in Appendix 1. The Institute is governed by a Board of Directors, to which report: the Executive Committee, the Executive Director, six research committees, four strategic committees and six on-farm demonstration committees. The Executive Director of Alberta Agriculture's Research Division also serves as Executive Director of the Institute.

Board Of Directors

The governing authority of the Alberta Agricultural Research Institute is its Board of Directors. The Board creates by-laws and policies that guide the general business and affairs of the Institute. In addition to providing overall directions and strategies for the Institute, the Board makes funding decisions on research and technology transfer projects. Project approvals are based upon recommendations from AARI's various committees.

The Board's Chairman is appointed by the Associate Minister of Agriculture. As prescribed in the 1987 AARI Act, the Board shall include the Deputy Minister of Alberta Agriculture (who serves as the Board's Vice-Chairman) and the University of Alberta's Dean of the Faculty of Agriculture and Forestry.

The Act specifies that the Board must also have representatives from: the University of Calgary; the Western College of Veterinary Medicine (University of Saskatchewan); Alberta Advanced Education; Alberta Technology, Research and Telecommunications **or** the Alberta Research Council; and Agriculture Canada.

The Board must have a minimum of nine producers and agri-business representatives, and such members of the Legislative Assembly as are appointed by the Minister. The broad spectrum of representation on the Board enhances the Institute's ability to achieve its goals.

The Board met five times during 1991-92. Meetings primarily involve discussion and decisions on project proposals, specific program activities, committee reports and financial matters. The Board also decides upon a diverse range of emerging issues within the scope of the Institute's mandate.

An important function of the Board is to act in an advisory capacity to various government and private sector agencies on matters related to agri-food research. For example, research recommendations were submitted in the past fiscal year to the Canadian Agricultural Research Council. This advisory role of the Board is critical in identifying and co-ordinating research of utmost importance to the agricultural industry.

Other issues dealt with by the Board in 1991-92 were the Institute's five-year strategic plan and the amended master agricultural research agreement between the federal and provincial governments.

Committees

A streamlined re-organization of the Institute's committees followed the Farming for the Future merger. The result was an efficient organizational structure, capable of selecting high priority research proposals, transferring project results to appropriate end-users and recommending immediate and long-term strategies for the Institute.

Research committees were reduced in 1991 from 13 to six. The new alignment more accurately reflected commodity/discipline groupings and broad research divisions. Each research committee is chaired by a Board director. Vice-chairmen of research committees are also Board directors. Alberta Agriculture staff serve as executive secretaries for the committees. Executive secretaries and committee members are appointed by the Board. Membership consists of individuals with a wide range of expertise from industry, government and academia. The primary function of the committees is to evaluate research proposals. Funding is recommended on a priority basis, according to the rated potential of a proposal to benefit Alberta's agriculture and food industry.

The six **on-farm demonstration committees** represent Alberta by agricultural region. Their structure remained unchanged following the Farming for the Future merger. The committees consist of producers and Alberta Agriculture staff. Each committee is chaired by an Alberta Agriculture regional director. The primary task of these committees is to review proposals for demonstration projects that will help transfer new technology to producers.

Strategic committees were created with a 'think tank' philosophy. The rapidly changing face of global agriculture demands constant attention to emerging issues, technologies, markets and other industry trends. These topics are among those addressed by the four strategic committees. Committee meetings provide a forum for new ideas and priority research consideration. The committees also advise the Board on long-term policy directions and oversee the Research Professorship Program. Strategic committee members are appointed by the Board and represent industry, government and academic institutions. Each committee is chaired by a Board director. All four chairmen also serve as members of the Institute's Executive Committee.

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The Institute's **Executive Committee** consists of the Chairman and Vice-Chairman of the Board of Directors, chairmen of the strategic committees and the Dean of the University of Alberta's Faculty of Agriculture and Forestry. The Executive Director of the Institute is also a non-voting member on the Executive Committee. The Committee meets as requested by the Board.

In addition to the foregoing committees, the Board may, at its discretion, create **ad hoc committees.** These may address, for example, broad issues with long-term implications for Alberta's agricultural industry. An ad hoc technology transfer committee presented an interim discussion paper to the Board during 1991-92.

Administration

Administration of the Institute's programs and daily affairs is the responsibility of Institute staff and employees of Alberta Agriculture's Research Division. A major administrative function is processing research and demonstration applications under the Institute's various programs. For approved projects, complete records of all relevant project activities are maintained.

A number of background documents are prepared, as required by the Board. Staff respond to various inquiries from researchers, producers, the agri-food industry, trade associations, Alberta Agriculture staff, other government agencies, the media and the general public. Ministerial briefings are also written as required.

An important administrative function is organizing meetings, workshops, tours and conferences. Staff arrange Board and committee meetings, research workshops and other meetings as required. Farming for the Future conferences, which have historically been held every other year at various locations in the province, are also organized. During the past year, a tour of Agriculture Canada's Research Station and Alberta Agriculture's Field Crop Development Centre, both located in Lacombe, was co-ordinated.

An essential administrative activity is public relations. One of the Institute's priorities is to make research and technology transfer results available and easily accessible to the agricultural community and general public. This goal is first accomplished through distribution of a number of publications. These materials primarily consist of a newsletter (*Research Report*), the Institute's annual report, final reports of research projects, pamphlets, brochures and news releases.

Another effective way in which research and technology transfer information is disseminated is through a computerized database system. During the fiscal year, the computerized information system underwent a name change to more accurately reflect its services. Previously known as the Ag-Research BBS (Bulletin Board System), it is now called AGRIS, the Agricultural Research Information System. This system has expanded its database of Farming for the Future's research and on-farm demonstration projects to include projects under the Matching Grants and Research Co-ordination Programs.

The use of AGRIS has grown steadily since its experimental launch in 1989. Its increased popularity is likely due to expansion of the database, ease of use, increased use of computers by the agricultural community and also the provision of additional software packages on editing, accounting and communications. The dataline number for AGRIS is (403)438-2209. Information on the system is detailed in *Research Report*, Volume 7, Number 1 (September, 1992), available from Alberta Agriculture's Research Division (427-1956).

Programs

Based on committee recommendations, the Board of Directors approves research projects with the greatest potential to improve the competitiveness and profitability of Alberta's agriculture and food industry.

In 1991-92, the Alberta Agricultural Research Institute managed eight research and technology transfer programs. From April 1, 1991 to March 31, 1992, the Institute provided over $5.2 million in support of six research funding programs. The Matching Grants and Research Co-ordination Programs received unusually low, new funding for this period. This was a due to a calendar to fiscal year transition in funding.

Farming For The Future Research Program

The Farming for the Future Research Program is the cornerstone of the Institute's overall research efforts. Approximately $4 million was approved by the Board for 105 research projects in the fiscal year 1991-92. These projects were selected from a total of 205 proposals requesting $8.7 million. The $4 million represented 75 per cent of the total AARI approved funding for all programs.

Table 1 breaks down Farming for the Future research projects and funding by the commodity/discipline grouping of the research committees. A detailed list of research projects can be obtained from Alberta Agriculture's Research Division.

Table 1 - Farming For The Future Research Projects, 1991-92

COMMODITY/DISCIPLINE	PROJECTS	FUNDING
Beef and Dairy	25	$998,046
Cereals and Oilseeds	21	903,854
Forage, Pulse, Vegetable and Other Crops	22	807,642
Pork, Poultry, Sheep and Other Livestock	19	746,759
Policy, Economics and Marketing	6	168,690
Resource Conservation	12	361,305
TOTAL	105	$3,986,296

Each proposal is distributed to the appropriate research committee for evaluation. Submissions must be relevant to the broad areas of agriculture and food marketing, processing and production, and resource conservation.

The research committees recommend proposals that show scientific and economic merit, and are most relevant to the Institute's goals and priorities. Based on committee recommendations, the Board of Directors approves research projects with the greatest potential to improve the competitiveness and profitability of Alberta's agriculture and food industry.

Farming For The Future On-Farm Demonstration Program

A high priority goal of the Alberta Agricultural Research Institute is rapid transfer of research results to end-users. The Institute's technology transfer efforts have been most apparent in the Farming for the Future On-Farm Demonstration Program.

A high priority goal of the Alberta Agricultural Research Institute is rapid transfer of research results to end-users.

On-farm demonstration projects put new technology into action at the "grassroots" level of the farm. Extending the research and development process to producers injects enthusiasm into the farming community. Projects are varied and range from improved methods of animal nutrition to new agronomic packages for crop production. The demonstrations tend to attract the surrounding community, thus accelerating technology transfer through a multiplier effect.

Total approved funding for 73 demonstration projects in 1991-92 was $474,000. Table 2 breaks down project numbers and funding by agricultural region. A complete project listing for 1991-92 may be obtained from the Research Division.

Table 2 - Farming For The Future On-Farm Demonstration Projects, 1991-92

REGION	PROJECTS	FUNDING
Southern Alberta	12	$133,822
South Central Alberta	17	93,422
North Central Alberta	18	101,460
Northeast Alberta	5	30,345
Northwest Alberta	7	71,452
Peace River Region	14	43,270
TOTAL	73	$473,771

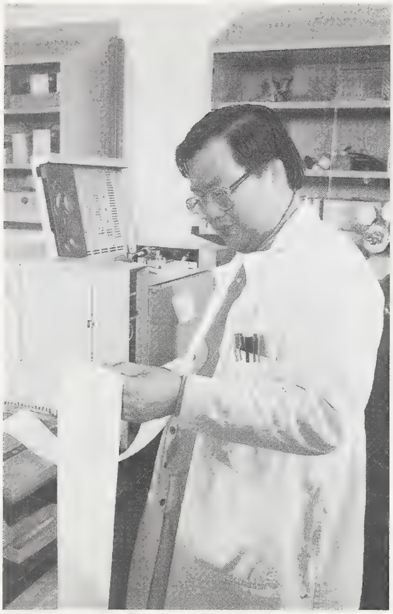
The On-Farm Demonstration Program is a vital program of the Institute. The commitment and positive results evident during demonstrations benefit the entire agricultural community by carrying the initial research investment to fruition.

Matching Grants Program

A vital program to the Institute's strategic plan, the Matching Grants Program primarily encourages private sector participation in the research and development process. Joint research projects with designated federal or other provinces' agencies are also eligible for funding.

A team approach to agricultural research and development in Alberta requires active participation by the private sector. The Matching Grants Program is the Institute's main vehicle for a co-operative research effort between the public and private sectors. Funds are generally provided on a 50:50 matching basis to projects with secured industry support. In many cases, funding from industry exceeds the required 50 per cent share.

For the Matching Grants Program, fiscal year new funding of $69,000 (total for three projects) represented an anomaly, compared to over $1 million approved annually prior to 1991-92. This reflected a one-year period to change Matching Grants funding from the calendar to government fiscal year. The previous submission of applications, in September, 1990, resulted in project funding of $1.8 million for a 15-month extended period beginning January 1, 1991. The net



result of this transition had the effect of increasing 1990-91 research grant expenditures and reducing those for 1991-92.

The deadline for the Matching Grants research proposal competition is now November 1. Funding for approved projects begins the following April 1. Proposals submitted by November 1, 1991 and approved by the Board received funding beginning on April 1, 1992. This will be reported in the 1992-93 annual report.

Research Co-ordination Program

The Research Co-ordination Program is primarily intended to bring agricultural researchers together for information sharing and maximizing research co-operation. With a 'think tank' strategy to agricultural research, scientists discuss, direct and streamline similar investigations.

Project funding generally covers expenses for travel to meetings, inter-laboratory exchange and communications costs (modem, fax, long-distance telephone, printing). Although this is not a high cost Institute program, it received unusually low funding in 1991-92, for reasons explained under **Matching Grants Program.**

For the fiscal period 1991-92, a single Research Co-ordination project was approved for funding of $5,000. "Work Planning Meetings to Develop a Co-ordinated, Multi-Disciplinary Oat Research Program for Alberta," was co-ordinated by Dr. S. Kibite at Agriculture Canada's Lacombe Research Station.

Research Professorship Program

The main objective of the Research Professorship Program is to intensify scientific investigation of target disciplines. Areas requiring increased study are identified by their perceived benefit to Alberta's agriculture and food industry.

In 1991-92, the Institute continued support of three research professorships with total funding of $240,000 ($80,000 each). A fourth AARI professorship, soil conservation, also received $80,000, from the Canada/Alberta Soil Conservation Initiative (CASCI). The four research professorships are:

1. Food Packaging and Preservation Research Professorship - University of Alberta.
2. Marketing of Value-Added Agricultural and Food Products Research Professorship - University of Alberta.
3. Soil Conservation Research Professorship - University of Alberta.
4. Animal Welfare/Ethology Research Professorship - University of Saskatchewan, Western College of Veterinary Medicine.

Under the Research Professorship Program for 1991-92, a total of $158,000 was approved for specific research projects. As well, a major effort in soil conservation received substantial financial support from CASCI. The multi-year project, "Sustainable Cropping Research Systems Study," was supervised by the Soil Conservation Research Professorship. Managed by AARI, the study was co-ordinated among Agriculture Canada, Alberta Agriculture and University of Alberta scientists. Total funding provided by CASCI for the fiscal year was $375,000, of which $295,000 went to the study and $80,000 to the Professorship.

National Agricultural Biotechnology Initiative

The use of biotechnology by Alberta's agricultural industry is still in its fledgling stages. It is, however, a leading-edge researcher's tool rapidly growing in importance. Biotechnology benefits agriculture with: improved crop varieties; new and improved agri-food products; more effective livestock vaccines; new uses for conventional agricultural commodities; better diagnostics for food safety; improved biological pest control agents; and improved resource management practices.

The Alberta Agricultural Research Institute supports the development and commercialization of biotechnology through the National Agricultural Biotechnology Initiative (NABI). NABI is a joint program of the federal government and the four western provinces. The federal portion of the program is administered by the Department of Western Economic Diversification.

The Institute's Board of Directors approves funding of biotechnology projects with the potential to diversify and strengthen Alberta's agricultural industry. In addition to AARI and Western Economic Diversification funding, NABI projects are cost-shared by the private sector. For 1991-92, the Institute's share of NABI funding totalled $201,000 for three projects.

Agricultural Research Reviews Program

The Agricultural Research Reviews Program began in 1989. Periodic commodity/discipline reviews are held to strengthen research co-ordination and co-operation. The reviews are conducted in a seminar/workshop format. Reviewing agri-food research by commodity and discipline focuses specific sector research needs. Information sharing contributes to an assessment of current activities and identification of leading-edge research requirements.

In 1991-92, research reviews were held for: farm financial management; special and alternate crops; and crop and livestock products processing. Reviews were held prior to 1991-92 for beef, forages, pulses, grains, oilseeds, dairy, poultry, land and water, swine and horses.

Externally Funded Research Program

For the purpose of supporting agricultural research, the Institute has the ability to administer funds from external sources. The external funding may be from industry, the federal government or other provincial governments. In 1991-92, the Institute administered funds for seven industry sponsored projects. The Institute also managed two projects funded by Agriculture Canada through the Prairie Farm Rehabilitation Administration. The two projects examined sustainable grazing systems and the effect of agricultural practices on water quality.

Research Highlights

A considerable amount of high quality research and technology transfer was supported by the Alberta Agricultural Research Institute in 1991-92. The following highlights grouped by commodity/discipline illustrate funded research that: demonstrated results potentially beneficial to the agricultural industry in Alberta; investigated high priority agricultural concerns; and/or explored leading-edge technology.

The research highlights encompass all eight programs administered by the Institute, grouped according to the six commodity/discipline areas of the research committees. In certain areas, depending on the scope and potential impact of a scientific investigation, a subject was researched within several programs. For example, aspects of copper deficiency in cereal crops were studied in projects under the Farming for the Future, Matching Grants and Externally Funded Research Programs.

Availability of results from individual studies varied depending on whether the project was new, continuing or completed. Additional information and complete project listings can be obtained from Alberta Agriculture's Research Division (427-1956).

Beef And Dairy

Alberta is the leading producer of livestock in Canada. It is also Canada's top beef producer. Cattle and calves were Alberta's most important commodities in 1991, based on preliminary farm cash receipts of $1.54 billion. Receipts for milk and cream in the same year were $250 million. The meat processing industry (excluding poultry) also represents the largest portion of Alberta's agri-food industry. The forecasted value of meat shipments in 1990 was $2.29 billion, over 50 per cent of the total $4.52 billion value of processed food products.

Cattle and calves were Alberta's most important agricultural commodities in 1991.

A high priority goal of the Institute is to promote increased industry participation in agricultural research and development.

The **Farming for the Future Research Program** provided the lion's share of funding for beef and dairy research approved in 1991-92. Nearly $1 million was approved for 25 projects. Most studies focused on animal nutrition, reproduction and disease control. Two projects studied mastitis, the most costly infectious disease affecting milk quality and quantity in Canada. One of these projects examined potential enhancement of mammary gland immunity to mastitis. Other areas researched were: the role of lactose, glucose and milk absorption in diarrheic calves; forage digestibility in ruminants; and the role peptides play in microbial growth and protein availability in cows.

The importance of value addition to meat products was addressed in a number of projects funded under the Farming for the Future Research Program. One researcher examined controlled atmosphere storage of beef. Progress was reported in extending storage life of beef, suggesting a potential for expanding export markets. Extension of meat storage life with modified atmosphere packaging was also researched in a Matching Grants Program project and reviewed under the Research Co-ordination Program. Although meat storage life was not restricted to beef in these studies, their results may be valuable to the beef industry for increasing continental and overseas markets.

Leading-edge technology was evident in two Farming for the Future research projects. Supercritical fluid extraction was used to develop high value biological materials from packing plant by-products. The other project used biotechnology to produce new strains of lactic acid bacteria for extending meat storage life. These bacteria were similar to those used in the manufacture of cultured dairy products such as cheese and yogurt.

A high priority goal of the Institute is to promote increased industry participation in agricultural research and development. The degree to which this occurs is evident in the **Matching Grants Program.** Although the program is not restricted to joint funding with industry alone, it reflects some of the research needs for Alberta's agriculture and food industry.

Although only three new Matching Grants projects were initiated during the fiscal year, 24 beef and dairy projects were approved total funding of $803,000 for the 15-month period beginning January 1, 1991. Several projects studied animal nutrition and disease control, reflecting similar research needs identified under the Farming for the Future Research Program. Diversification was the impetus for a number of processing projects, including: production of allergy-free infant formula based on cow's milk; development of UHT (Ultra-High Temperature) whipping cream with extended shelf life; and production of highly marbled beef for the Japanese market.

The role of omega-3 fatty acids in cardiovascular disease prevention was studied in an earlier (1988) Farming for the Future research project. The project examined the effect on eggs of enriching chicken feed with high levels of canola and flax, both good sources of polyunsaturated fatty acids (precursors to omega-3 fatty acids). The research resulted in the commercialization of so-called "designer eggs." This concept was extrapolated to a Matching Grants project, funded with about $100,000 each from the Institute and the Dairy Bureau of

Canada. The study's objective was to demonstrate a blood lipid lowering effect from a diet containing saturated fats (dairy fats, for example) in combination with modest amounts of omega-3 fatty acids from sources such as canola oil.

One Matching Grants project explored the use of new ultrasound technology for evaluation of live cattle body composition. This technology could enable producers to accurately determine the genetic ability of cattle to produce desirable muscle and marbling characteristics.

There were no new beef and dairy project approvals in the fiscal year under the **Research Co-ordination Program.** Two projects were funded in the 15-month period of January 1, 1991 to March 31, 1992. The first project, "Research to Extend Chilled Storage Life of Meat/Poultry/Processed Products," has been mentioned. The second, "Mastitis Research in Agriculture Canada (Lethbridge) and the University of Calgary," co-ordinated research efforts against this costly dairy cattle infection. Mastitis causes direct losses to the industry in western Canada of approximately $15 million annually.

Under the **Research Professorship Program**, a three-year dairy project, "The Application of Modified Atmosphere Packaging Technology to the Dairy Industry," was initiated by the Food Packaging and Preservation Research Professorship. The study will apply gas packaging technology to shelf life extension of cultured dairy products and to aging of cheeses. The Animal Welfare/Ethology Research Professorship conducted a special project in 1991-92, "Improved Productivity and Welfare in Domestic Food Animals Through Application and Investigation of Behavioural Processes." The scope of the study also extended to pork, poultry, sheep and other livestock. Its objective was to increase productivity through improved animal welfare.

A beef research project under the **National Agricultural Biotechnology Initiative** was an exciting highlight of the past year. Investigation of *in vitro* bovine fertilization and embryo production was a prime example of the high technology and diversification required for Alberta to compete globally. Preliminary findings indicated a potential for Alberta to step forward as a world leader in commercialization of frozen bovine embryos.

New technology arising from Institute research programs is often farm tested under the **Farming for the Future On-Farm Demonstration Program**. Twenty beef and dairy on-farm demonstration projects were approved a total of $97,000. Most of the projects demonstrated new and improved methods of cattle nutrition. One northeast Alberta project, for example, demonstrated the use of field peas as a protein source for high-producing cows. Other projects tested electronic identification of cattle, improved methods of pasturing and advances in fertility. With eight projects, north central Alberta was the most active region in beef and dairy demonstrations.

A Livestock Products Processing Review was held under the **Agricultural Research Reviews Program.** The review also covered pork, poultry, sheep and other livestock. Participants in the review from the private sector, government and academia identified a number of research requirements. One of the main

The bison industry diversifies and strengthens agriculture in Alberta.

issues was meat quality and safety. Some of the research needs proposed were: improved methods for detection of pathogens and drug residues in meats; development of "designer meats" (low fat, low salt, low cholesterol); use of biotechnology for improving meat quality; and development of training programs for meat safety.

Pork, Poultry, Sheep And Other Livestock

Farm cash receipts for hogs in 1991 were $270 million. Hogs are Alberta's second highest earning livestock commodity. Receipts for poultry (chickens, turkeys, eggs) in 1991 were $143 million. The addition of value to Alberta's poultry products represented four per cent of the forecasted total value of shipments for 1990. Examples of other livestock include: horses, bison, goats, rabbits, elk, llamas, ostriches, wild boar, crossbred yaks, fish and honeybees. Alberta is Canada's leading producer of honey.

In 1991-92, the Board approved $747,000 for 19 **Farming for the Future Research Program** projects in this commodity grouping. Over half of them were swine studies. Swine research ranged from control of a costly infection in western Canadian swine, *Streptococcus suis*, to fertility enhancement with improved post-weaning nutrition. One processing project studied storage life extension of pork.

Research on livestock other than swine in 1991-92 was diverse. Continuing projects studied the role of vitamins in horse nutrition, energy efficiency of wapiti and intensive production of broiler chickens. One project used menthol to control tracheal mites in honeybees. The mite first appeared in Canada in the 1980s and has inflicted heavy losses on the honey industry. Another study attempted to develop a vaccine for control of strangles, an infectious disease in horses.

Only three new projects were approved under the **Matching Grants Program** during the past fiscal year, none of which relate to this livestock grouping. However, for the extended period of January 1, 1991 to March 31, 1992, 17 pork, poultry, sheep and other livestock projects were approved a total of $314,000. A three-year project studied colisepticemia, an invasive and costly disease in the turkey industry. The potential for vaccination against the disease appears to be positive.

Three projects were supported in the battle against the honeybee tracheal mite. Gamma irradiation was used for disinfecting honeybee equipment in one study. The most recent research is attempting to breed mite resistance into honeybees.

Most of the Matching Grants pork projects concentrated on nutrition. The use of canola as pig feed exemplified the constant search for import replacement and non-conventional uses of raw commodities.

Improved methods of pig nutrition were researched, including the use of canola for feed.

Under the **Research Co-ordination Program**, a continuing project referred to under **Beef and Dairy** co-ordinated research efforts for storage life extension of pork, poultry and other processed meat products. The potential for market expansion with storage-durable meats designates research of this nature to be high priority.

Alberta farmers are seeking diverse forms of agriculture to stabilize their long-term incomes. This was typified in a demonstration project that examined the use of farm ponds and dugouts for trout production.

The **Farming for the Future On-Farm Demonstration Program** allocated a total of $40,000 for five projects in this livestock group. One project demonstrated the use of cheap, outdoor huts as an alternative to crowded farrowing rooms. One trial showed that outdoor pigs were healthier than those farrowed indoors. Menthol control of the honeybee tracheal mite was demonstrated in another project, an example of direct technology transfer from a Farming for the Future research project. Two poultry projects examined data on broiler breeder flocks for increasing hatchability.

Alberta farmers are seeking diverse forms of agriculture to stabilize their long-term incomes. This was typified in a demonstration project that examined the use of farm ponds and dugouts for trout production. Aquaculture diversifies the agricultural industry. In 1990-91, there were 2,300 private game fish farmers in Alberta.

Cereals And Oilseeds

Cereal crops have anchored the province's agricultural industry since its pioneering days. Alberta is the leading producer of barley in Canada. It is also a major producer of wheat and canola. Farm cash receipts for wheat, canola, barley and oats in 1991 were $685, $345, $224 and $22 million, respectively. Including rye and flaxseed, cereal and oilseed crops represent nearly 70 per cent of Alberta's total farm cash receipts from crops.

One only has to examine the success story of canola to acknowledge the importance of research and development to Alberta's crop production capability. The province also has one of the top barley breeding programs in the world. The program was spearheaded by Dr. Jim Helm at Alberta Agriculture's Field Crop Development Centre in Lacombe. His work - a portion of which was earlier funded by the Farming for the Future Program - led to new barley varieties of significant economic benefit to Alberta's feed industry. Dr. Helm's work was acknowledged during the past year. He was among the finalists for the Innovation in Alberta Technology category of the 1992 Alberta Science and Technology Leadership (ASTech) Awards.

A total of $904,000 was approved for 21 cereal and oilseed projects under the **Farming for the Future Research Program** in 1991-92. Crop diseases, environmental concerns and consumer priorities were driving forces behind many of the projects. Breeding of disease-resistant crops was investigated in the following studies: the use of biotechnology for blackleg tolerance in canola; *in vitro* canola resistance to the fungus, *Alternaria*; development of snow mould resistance in winter wheat; transfer of Russian wheat aphid immunity to wheat; and development of wheat cultivars resistant to mite-transferred viruses.

Farming for the Future supported numerous research projects aimed at canola improvement in 1991-92. Canola characteristics studied were disease resistance, suitability to Alberta growing conditions, and oil yield and quality. Biotechnology was applied in one project, "Development of Specific Probes for an Important Oil Formation Enzyme in Canola." This study made significant advances in isolation and immunological detection of the enzyme responsible for canola oil formation.

A Farming for the Future project funded since 1987, "Evaluation and Development of Soft White Spring Wheats for Western Canada," resulted in two new cultivars of soft white spring wheat. Conducted at the Agriculture Canada Research Station in Lethbridge, the study produced higher yielding varieties with improved disease resistance. One of the cultivars, AC Reed, was registered in 1991. Certified seed will be available for commercial production in 1994. AC Reed was found to be equal or superior to the traditional cultivar, Fielder, in overall baking and milling qualities. The other cultivar developed from the research was lower in quality but suitable for flatbread.

Funding provided by AARI contributed to the development of new and improved varieties of soft white spring wheat.

One processing project responded to a quality and marketing problem in canola oil. Canola oil develops undesirable odours and flavours during cooking and storage from oxidation of its fatty acids. This study assessed the potential benefit of adding tocopherols (antioxidants) to improve oil quality and durability.

Under the **Matching Grants Program** for the period of January 1, 1991 to March 31, 1992, 17 cereal and oilseed research projects were approved for total funding of $275,000. No new projects were approved during the fiscal year. Various aspects of canola production were researched. Subjects investigated ranged from improving disease resistance to biotechnological improvement of yield and quality. One project, "Oilseed Diversification by Metabolic Engineering of Canola," identified seed-specific promoters with the potential to be of commercial interest for: alteration of seed protein for production of premium meal; modification of seed oil for production of specialty oils and waxes; and changing seeds to produce high quality proteins for the pharmaceutical and enzyme industries.

One Matching Grants study resulted in higher yielding short strawed winter wheats than the current leading cultivar, Norstar, with no loss in quality. Winter wheat is an established crop in southwest Alberta. It has the agronomic advantages of early harvest and adaptability to conservation tillage. This research may lead to more widespread acceptance of winter wheat as an alternative crop in Alberta.

One response to chemical treatment of crop disease is biological control. Two Matching Grants projects adopted this strategy. The first project experimented with predatory insects and fungi to control the Russian wheat aphid (RWA), an extremely destructive insect in wheat. Since RWA is an exotic pest, positive results to date have only involved the use of imported predators (wasps). Experiments with aphid fungi isolated in Eurasia are in progress. A second biological control project found a strain of fungus to be potentially effective against grasshoppers.

A continuing **Research Co-ordination Program** canola project - "Crop Molecular Biology and Biotechnology in Alberta: A Workshop to Review and Plan *Brassica* Research" - was awarded $5,000 for the 15-month period beginning January 1, 1991. Two workshops have been held. Progress was made by information sharing and planning research related to the canola genus, *Brassica*. Research on other crops was also reviewed.

Research continued in 1991-92 to improve canola yield, quality and disease resistance.

A total of $128,000 was approved in 1991-92 for 15 cereal and oilseed projects under **Farming for the Future's On-Farm Demonstration Program**. Direct technology transfer of research results was exemplified in a southern region project which demonstrated agronomic practices for the new soft wheat cultivar, AC Reed. This new crop variety was developed, in part, with support from the Farming for the Future Research Program.

In some cases, new products and technology were tested at various locations in the province, to select optimum crop growing areas. The On-Farm Program, for example, demonstrated the potential of new oilseed crops - mustard, sunola, safflower and corn - in two regions, southern and north central Alberta.

In other demonstration projects, improved crop practices were shown to farmers at various locations in the province. Three regions were awarded funds to demonstrate new canola production practices. The objective of the projects was to increase profitability through improved quality, increased yield and/or reduced costs.

Two projects under the **Externally Funded Research Program** focused on plant diseases. One studied seed treatment in controlling barley leaf diseases. The other project, sponsored by the Alberta Canola Producers Commission, examined the relationship between *Alternaria* blackspot - a very costly canola disease - and oilseed yield and quality.

The Institute held a Crop Products Processing Review under the **Agricultural Research Reviews Program**. Some research needs suggested by industry, government and academic representatives were: the use of grains and oilseeds for pharmaceuticals and other non-food products; the use of oat hulls in baked goods, packaging and the heavy oil industry; the development of value-added pulse products; and the development of a processing technology demonstration program.

Forages, Pulses, Vegetables And Other Crops

It may be somewhat surprising that forages are Alberta's number one crop. This is based on tonnage, acreage and total value. In 1991, their estimated on-farm cash equivalent was $775 million, compared to $685 million in farm cash receipts for wheat. Forages comprise legumes (alfalfa, clover) and grasses. Their primary value is as domestic feed. Exported forage feed and seed are also valuable components of the industry. Alberta is the leading forage seed producer in Canada. Forages also play a vital role in soil fertility and soil/water conservation.

Pulses (peas, beans, lentils) are important alternatives in Alberta's crop industry. As well as providing diversification options to producers and processors, they contribute to soil fertility and soil/water conservation.

In 1991, vegetables, potatoes and sugar beets garnered farm cash receipts of $41, $38 and $21 million, respectively. Alberta also has an established sugar beet, vegetable and fruit processing industry. The 1990 forecasted value of processed (other than preserved and canned) fruit and vegetable shipments was $67 million.

Forages are Alberta's number one crop based on tonnage, acreage and total value.

Farmers in Alberta realize that one step to economic stability is diversification. A rich assortment of alternative crops have been grown successfully in Alberta. Some of these crops are: sunflower, safflower, mustard, canaryseed, spice and essential oil crops, saskatoons and other berries, buckwheat, wild rice, greenhouse vegetables and ornamentals, and nursery stock. In many cases, the commercial introduction of specialized crops arose, in part, from research supported by AARI.

Research and technology transfer are essential inputs for successful introduction of new crops in Alberta. They are instrumental in discovering new crop products and new uses for conventional crops. In 1991-92, a total of $808,000 was approved for 22 forage, pulse, vegetable and other crops projects under the **Farming for the Future Research Program.** Research projects studied a diversity of crops and objectives, such as: development of a safflower production package; salinity tolerance of forages, turf grasses and ornamental trees; detection of potato viruses; increasing greenhouse cucumber yield; and fairy ring control in turf grass.

A fruit processing project evaluated the quality of processed saskatoons. A second processing study attempted to develop value-added products from rhubarb stalks. Newly approved (1991-92) Farming for the Future research projects investigated: quality control of biological control agents; mechanical properties of legume forages relative to ruminant digestion; dry bean resistance to bacterial blight and mosaic virus; and new methods of evaluating forage intake and digestibility by ruminants.

A total of $153,000 was approved for ten **Matching Grants Program** projects for the period of January 1, 1991 to March 31, 1992. There were no new approvals for forage, pulse, vegetable and other crops projects during the fiscal year. Most projects studied various aspects of forage production, including: the forage potential of native grass species; alfalfa nodulation with a developed inoculant;

Research and technology transfer are essential inputs for successful introduction of new crops in Alberta. They are instrumental in discovering new crop products and new uses for conventional crops.

yield and longevity of alfalfa/bromegrass mixtures; alfalfa seed quality and yield; and the effect of fertilizer and inoculum application methods on alfalfa quality and yield.

A turfgrass project studied management of recreational greens from an environmental perspective. This research was prompted by the concern of environmental pollution with fertilizers and other chemicals applied to sand-based golf and bowling greens. The results of this research may have some applicability to farm field situations.

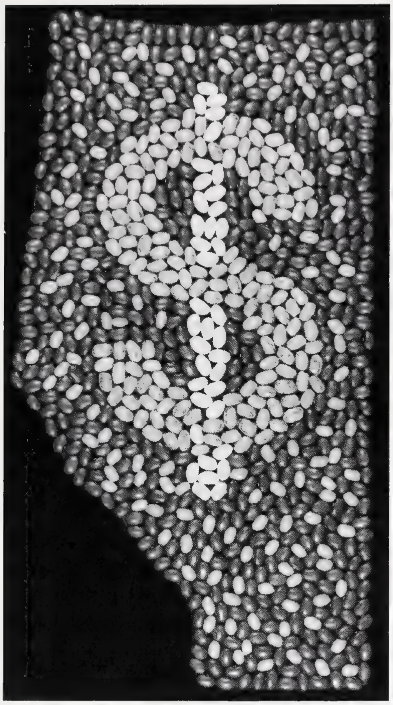
Field peas are an important crop diversification option for Alberta farmers. Root rot disease exacts a heavy toll on the profitability of field peas. One Matching Grants project found an integrated biological-chemical management system with the potential for controlling root rot. A potato project produced new cultivars with increased disease resistance and improved processing qualities. These cultivars could benefit Alberta's potato industry through import replacement and disease reduction.

The **Farming for the Future On-Farm Demonstration Program** was active in the area of forages, pulses, vegetables and other crops during 1991-92. A total of $157,000 was approved for 20 projects throughout the province. Many of the projects were forage or pulse demonstrations. The multi-faceted value of forages was reflected in the diversity of the projects. A number of them demonstrated agronomic packages for forage seed production. Others tried improving forage adaptability to poor soils and introducing forages to newly broken land with a roller-seeder. Using winter cereal crops as forages was demonstrated in a south central Alberta project. In some forage projects, key secondary objectives were their role in conservation and in livestock nutrition.

New uses and markets for pulses have firmly established a significant niche for these crops in Alberta's agricultural industry. Their importance was emphasized in a number of on-farm demonstration projects in 1991-92. The Alberta Pulse Growers Commission was the principal co-operator for three pulse projects conducted in different regions. Innovative agronomic packages for beans, peas, lentils, lupins and other pulses were demonstrated in the southern region. In north central Alberta, projects were conducted to demonstrate silage and feed quality of pulses, and agronomic practices for field peas and fababeans.

A Peace River region project demonstrated the use of fababeans for seed production and their role in nitrogen fixation and soil conservation. A special crops project initiated in 1988 found lentils, peas, sunflower, safflower and canaryseed to be potentially profitable options to traditional major crops in east central Alberta. Management of the European corn borer was the objective of the lone vegetable demonstration project funded in 1991-92.

Under the **National Agricultural Biotechnology Initiative**, the Institute approved $68,000 for a legume project, "Biotechnology to Increase Legume Yield." The objective of the research was to increase lentil, pea and alfalfa yield through development of high efficiency, nitrogen-fixing rhizobacteria.



Courtesy of Mr. Ken Sinclair, Agriculture Canada, Lethbridge

Beans and other pulses are important economic crops in the province's agriculture and food industry.

A number of industry sponsored potato research projects were administered in 1991-92 under the **Externally Funded Research Program**. Areas researched were: transmission of blackleg disease to seed potatoes; a rapid screening method for total glycoalkaloids in potatoes; the effect of the herbicide imazethapyr (Pursuit) on potatoes in rotation with wheat and canola; and treatment of potatoes with the herbicide clethodim (Select).

A Special and Alternate Crops Research Review was held under the **Agricultural Research Reviews Program**. The review was attended by producer groups, research associations, marketing boards, university and government personnel. Participants identified a high priority need for biotechnological development of disease resistant, early maturing, high nutrient yielding crop varieties. Other suggested research directions should respond to the demand for improved food packaging, better market information and further improvement of technology transfer mechanisms.

Resource Conservation

Soil and water form the underpinning of all agricultural systems. Although many other resources are required for agricultural production and processing - good quality air and human resources to name two - conservation, in most cases, connotes soil and water. The land is agriculture's most precious resource. Once it is lost, it can be replaced only in geologic time spans. Soil and water can be lost or degraded quickly when subjected to poor management and environmentally unacceptable practices.

Research aimed at long-term conservation of the province's soil and water resources is a crucial investment for all Albertans. The Alberta Agricultural Research Institute acknowledges this through its continued support of resource conservation projects.

In 1991-92, a total of $361,000 was approved for 12 resource conservation projects under the **Farming for the Future Research Program**. A number of them examined the vital role of management practices, such as the use of forages, in soil and water conservation. One study found liquid sub-soil fertilization of forages with a pulse bander to be an effective conservation tool.

Tillage is critical to soil and water conservation. The role of reduced tillage in minimizing soil and water erosion has been extensively studied. The Agriculture Canada Research Station at Lethbridge has a long and impressive history researching soil and water conservation. Their continuous cropping plots are among the oldest in Canada.

Tillage was examined in five research projects. Some farmers opt for costly deep tillage of compacted soils. Not only does this reduce profitability, it causes moisture loss and may lead to loss of soil and fertility. Three projects studied soil compaction with different approaches. One attempted to ameliorate soil compaction with appropriate tillage. The other two projects attacked the problem by attempting to understand root growth in compacted soil and to improve root penetrability into compacted soils.

Research aimed at long-term conservation of the province's soil and water resources is a crucial investment for all Albertans. The Alberta Agricultural Research Institute acknowledges this through its continued support of resource conservation projects.

Environmental responsibility was apparent in two resource conservation projects. The use of lime rather than herbicides to control algal growth in farm dugouts produced promising results in one study. By treating the cause (excessive nutrients) instead of the symptom (plant growth), the researchers achieved an 88 per cent reduction in algal biomass over two summers of lime treatment. The second project examined herbicide translocation from soil to groundwater.

The **Matching Grants Program** supported 12 resource conservation projects with a total of $210,000 for the period of January 1, 1991 to March 31, 1992. "Elimination of Aquatic Weeds in Irrigation Canals Using Triploid Grass Carp," was awarded $39,000 during the fiscal year. In its fourth of a five-year study, the project, the first in Canada to use triploid grass carp, studied the potential of herbivorous fish to control nuisance vegetation in Alberta's 8,000 kilometres of open canal systems. This research exemplified the agricultural community's commitment to search for safe alternatives to chemical treatment. Although problems such as avian predation were encountered, results to date have been promising.

A number of Matching Grants conservation projects researched soil fertility. Aspects studied were: field and greenhouse assessment of new, elemental sulphur fertilizers; comparison of acid phosphorus fertilizers to conventional, granulated forms; evaluation of nitrification and urease inhibitors; and assessment of coated urea and time-release nitrogen compounds.

Alberta farmers spend approximately $100 million annually for phosphate fertilizer. To date, sufficiently reliable soil phosphorus tests have not been available for advising farmers on cost-effective fertilizer application. One newly approved project will evaluate the efficiency of a laboratory phosphorus test in the field.

Matching Grants conservation projects also studied: efficient management of irrigation canals; electric current use for odour control (oligolysis) in manure storage systems; and development of safe garments for agricultural workers handling anhydrous ammonia. In one project, sub-surface injection of liquid manure with a pulse-bander was effective in reducing odour problems. The researchers found the method less costly than surface application and effective in reducing soil erosion. Artificial wind barriers were examined in one study. Although they did not affect wheat yield, they did reduce seed shattering. The barriers were found to be valuable traps for snow to fill dugouts.

No new conservation projects were approved during the fiscal year under the **Research Co-ordination Program.** Two continuing projects were approved funds of $5,000 each for the 15-month period beginning January 1, 1991. "Co-ordination of Soil and Water Engineering Research in Alberta," reviewed soil and water research activities among scientists from Agriculture Canada, Alberta Agriculture and the University of Alberta. Project activities included the development of standard methods for tillage evaluation. The second project, "Soil Fauna and Structural Development Under Different Tillage and Cropping Systems," concluded that reduced tillage improves physical and biological qualities of soil structure. This has important implications for erosion-prone soils of the Peace River region and other similar areas in Alberta.

Legume plowdown is a popular conservation practice.

Under the **Research Professorship Program,** the Soil Conservation Professorship was active in a number of projects. As stated earlier, a multi-year project funded by CASCI and administered by AARI continued during 1991-92. Resulting from the project, the Soil Professorship presented long-term rotation study results at workshops, initiated rotation studies in important agro-ecological areas of the province, acquired critical monitoring equipment and compiled a crop database. The Professorship also studied soil erosion with computer models and the effects of artificially-eroded topsoil on productivity.

A total of $50,000 was approved for 12 resource conservation projects under the **Farming for the Future On-Farm Demonstration Program.** With five projects, Peace River was the most active region. Direct technology transfer to the farm from AARI funded research projects was evident in demonstrations such as: zero and minimum tillage in continuous cropping (Peace River); manure odour reduction with oligolysis (south central, and northeast Alberta); and soil injection with liquid manure (south central Alberta).

Salinization is a serious form of soil degradation. It occurs when water leaves dissolved salts at soil surfaces upon evaporation. In Alberta, approximately 1.2 million hectares of dryland are affected by saline seepage. This causes a 25 per cent reduction in crop yield. Resultant high nitrate and sulphate concentrations can also endanger people and livestock.

The Institute continues to support research aimed at minimizing salinization in dryland and irrigated farming. Two demonstration projects focused on soil salinization in 1991-92. Both showed the ability of a deep-rooting crop such as alfalfa to control salinity by drawing down the water table in recharge areas. One of the projects also demonstrated the use of salt-tolerant grasses in discharge areas.

Farming for the Future's technology transfer program tested various, new conservation techniques in the past year. Demonstrations were held to show: the use of Roundup with a no-till disc drill for seeding pasture sod (south central Alberta); clover plowdown to increase soil fertility and control Canada thistle (two projects, Peace River region); and moisture conservation and environmental benefits of backflood irrigation (Peace River region).

Policy, Economics And Marketing

Policy, economics and marketing impact on every facet of agriculture, from individual farm finance to international trade. The effects of agricultural policy and economic conditions on profitability are complex and multi-disciplinary. Research to characterize these effects is essential to understand mechanisms that affect competitiveness. Globally, modern agriculture has become highly specialized. Traditional, yield-driven research and development has become more market-driven. The profitability of the agri-food industry in the 1990s requires a better understanding of consumer preferences.

Agricultural economics in the 1990s requires a better understanding of consumer preferences.

In 1991-92, a total of $169,000 was approved for six policy, economics and marketing projects under the **Farming for the Future Research Program.** The effect of the Gross Revenue Insurance Program (GRIP) on farm production was examined in one project. The study concluded that GRIP provided a positive EMV (expected monetary value) for most crops, given low or high price scenarios. The research model showed GRIP to influence production and asset decisions for farm units within the same geopolitical boundaries.

Other topics investigated were: the impact of agricultural chemical use on productivity and the environment; effect of the Western Grain Stabilization Act on crop decisions and its application to other policy programs; and identification of market risks for beef and hog producers based on statistical analysis of North American livestock markets.

Under the **Matching Grants Program**, $3,000 was awarded to one policy, economics and marketing research project for the period of January 1, 1991 to March 31, 1992. "Production Trends in Western Canada's Feed Industry," studied trends and changes in the structure of the western Canadian feed industry.

"The Future of Agriculture" was a **Research Co-ordination Program** project initiated in 1989. It received funding of $5,000 for the 15-month period beginning January 1, 1991. This support contributed to a symposium, the proceedings of which were published in a very informative book, *Alternative Futures for Prairie Agricultural Communities*. Edited by Dr. Jerome Martin, the book presents futuristic aspects of farming from the point of view of several authors. "The Role of Transport in Alternative Futures for Prairie Agricultural Communities," was the subject of one chapter by AARI Board Director Ed Tyrchniewicz, Dean of the University of Alberta's Faculty of Agriculture and Forestry. The book describes possible scenarios of farming in the future, such as: the future of the farm family; challenges of globalization; education in agricultural communities; and holistic management in the future of agricultural communities.

Under the **Research Professorship Program,** an annual report was submitted by the Marketing of Value-Added Agricultural and Food Products Research Professorship. The Professorship has established a strong research program, particularly in the area of red meat marketing. The Professorship has also published several journal articles, proceedings papers and other materials relevant to the program.

A Peace River region project under the **Farming for the Future On-Farm Demonstration Program** analyzed farm family expenditures. Approved for funding of $1,715, the project was a co-operative effort by over 50 families. The study's objective was to demonstrate how to separate farm business from family expenses. This was part of a province-wide study, FAMEX 91, previously conducted in Alberta's other five agricultural regions. The study was twinned with a similar project conducted by Manitoba Agriculture. Data analysis for the six Alberta projects was performed by the University of Alberta's Department of Rural Economy.

A Farm Financial Management Research Review was held under the **Agricultural Research Reviews Program**. Producer, research, government and private sector participants identified several farm financial research needs, such as risk management strategies for farm entrants and better information on inter-generational transfer of farm assets.

Future generations will benefit from agricultural research.

Appendixes

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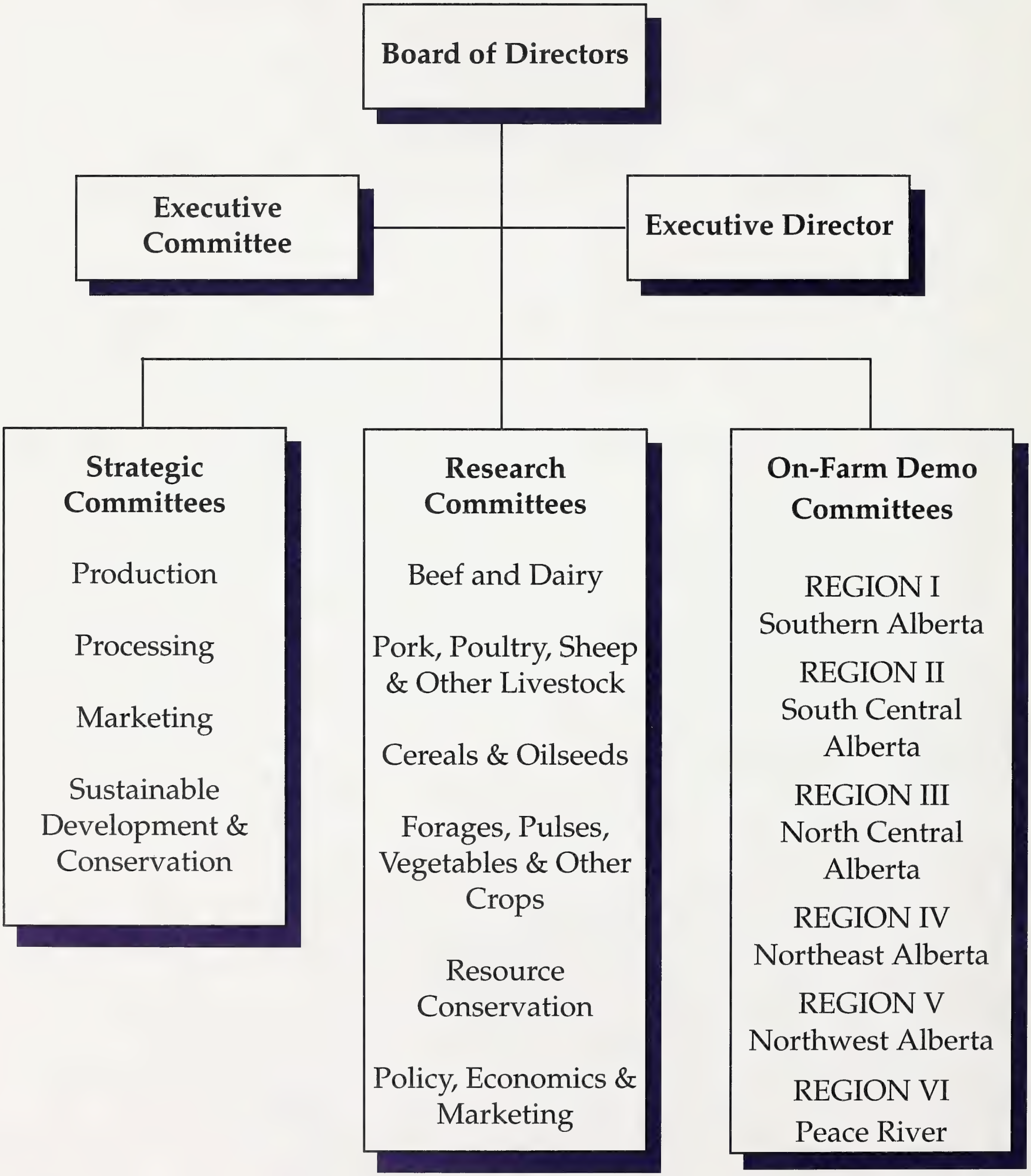
Appendix 1: Organizational Chart – AARI


Board of Directors
Executive Committee
Executive Director
Strategic Committees
Production
Processing
Marketing
Sustainable Development & Conservation
Research Committees
Beef and Dairy
Pork, Poultry, Sheep & Other Livestock
Cereals & Oilseeds
Forages, Pulses, Vegetables & Other Crops
Resource Conservation
Policy, Economics & Marketing
On-Farm Demo Committees
REGION I Southern Alberta
REGION II South Central Alberta
REGION III North Central Alberta
REGION IV Northeast Alberta
REGION V Northwest Alberta
REGION VI Peace River

Appendix 2: Financial Statements

ALBERTA LEGISLATURE

OFFICE OF THE AUDITOR GENERAL

AUDITOR'S REPORT

To the Members of the Board of the
Alberta Agricultural Research Institute

I have audited the balance sheet of the Alberta Agricultural Research Institute as at March 31, 1992 and the statement of revenue, expenditure and unexpended funds for the year then ended. These financial statements are the responsibility of the Institute's management. My responsibility is to express an opinion on these financial statements based on my audit.

I conducted my audit in accordance with generally accepted auditing standards. Those standards require that I plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In my opinion, these financial statements present fairly, in all material respects, the financial position of the Institute as at March 31, 1992 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles.

Donald D. Salmon
FCA
Auditor General

Edmonton, Alberta
September 18, 1992

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

BALANCE SHEET

AS AT MARCH 31, 1992

	1992	1991
ASSETS		
Cash	$3,364,876	$2,498,893
Accounts receivable:		
Due from Province of Alberta	13,995	14,295
Due from Government of Canada	102	722,854
	$3,378,973	$3,236,042
LIABILITIES AND UNEXPENDED FUNDS		
Accounts payable and unearned revenue	$ 843,930	$1,962,007
Unexpended funds	2,535,043	1,274,035
	$3,378,973	$3,236,042

The accompanying notes are part
of these financial statements.

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

STATEMENT OF REVENUE, EXPENDITURE AND UNEXPENDED FUNDS

FOR THE YEAR ENDED MARCH 31, 1992

	1992	1991
REVENUE		
Contributions from the General Revenue Fund (Note 3)	$ 850,000	$1,000,000
Contributions from the Government of Canada:		
Western Economic Diversification Program (Note 4)	500,000	1,000,000
Environmental Sustainability Initiative	472,811	338
Revenue Canada	102	-
Canada/Alberta Soil Conservation Initiative	375,000	375,000
Interest	293,863	273,474
Contributions from industry	202,108	142,288
Administration fees on contracted research	23,388	4,102
Research Coordination Conference	2,100	-
Grant from the Alberta Heritage Savings Trust Fund	-	682
	2,719,372	2,795,884
EXPENDITURE		
Research grants (Note 5)	489,296	1,908,083
Environmental Sustainability Initiative	472,811	338
Industry sponsored research (Note 6)	202,108	142,288
Administration expenses	165,768	173,757
Administered awards	128,381	192,757
Farming for the Future program conference costs	-	682
	1,458,364	2,417,905
Excess of revenue over expenditure	1,261,008	377,979
Unexpended funds at beginning of year	1,274,035	896,056
Unexpended funds at end of year	$2,535,043	$1,274,035

ALBERTA AGRICULTURAL RESEARCH INSTITUTE

NOTES TO THE FINANCIAL STATEMENTS

MARCH 31, 1992

Note 1 Authority

The Alberta Agricultural Research Institute operates as a provincial corporation under the authority of the Alberta Agricultural Research Institute Act, Chapter A-13.7, 1987, Statutes of Alberta 1987 as amended.

The purpose of the Institute is to promote, coordinate, priorize and support agricultural research ensuring transfer of the resulting knowledge for the benefit of a viable and sustainable agri-food industry.

Note 2 Significant Accounting Policies

Research Grants

Research grants are recorded when approved for payment by the Board of Directors.

Unexpended balances of grant funds held in researchers' accounts are not reflected in these financial statements.

Farming for the Future Program

Since April 1, 1991, the Institute has been responsible for approving and monitoring the use of grants paid from the Alberta Heritage Savings Trust Fund under the Farming for the Future Research and On-Farm Demonstration Programs. The grants are paid directly to recipients from the Heritage Fund and are not reflected in these financial statements.

Contributions from Industry

Contributions from industry represent cash donations to the Institute for specific research projects and do not include donations in-kind.

Administration Expenses

Certain salaries and other overhead costs, as well as accommodation costs incurred in the administration of the Institute, are borne by the General Revenue Fund and are not reflected in these financial statements.

Changes in Financial Position

A statement of changes in financial position is not provided as disclosure in these financial statements is considered to be adequate.

Note 3 Contributions from the General Revenue Fund

Contributions from the General Revenue Fund are subject to the approval of annual appropriations. The Institute may be required to refund unexpended portions of contributions held at the end of a fiscal year.

Note 4 Contributions from the Government of Canada

Pursuant to an agreement between the Government of Canada's Department of Western Economic Diversification, the Government of Alberta, and the Alberta Agricultural Research Institute, Canada agreed to contribute $4,000,000 to the Institute's agricultural research activities.

The agreement was amended in March 1992 to specify that the balance still due to the Institute would be paid as follows: 1991-92 $500,000; 1992-93 $950,000.

Note 5 Research Grants

In 1990-91, the Institute changed its basis of approving research grants from a calendar year to a fiscal year. As a transitional measure, grants were approved for a fifteen month period. This had the effect of increasing 1990-91 research grant expenditures and reducing 1991-92 research grant expenditures.

Note 6 Sponsored Research

Specific research projects are carried out in co-operation with Alberta Agriculture researchers for Industry and other Government sponsors.

Note 7 Approval of Financial Statements

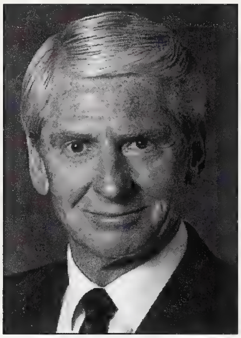
These financial statements were approved by management.

Appendix 3: Board of Directors – AARI

Chairman

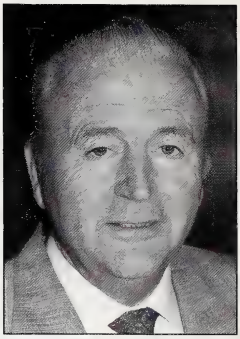
Mr. Bob Bogle
MLA
Taber-Warner

Vice-Chairman



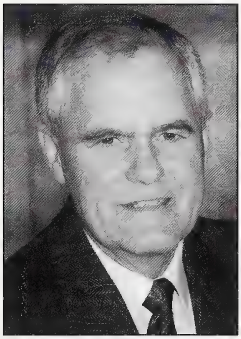
Mr. Ben McEwen
Deputy Minister
Alberta Agriculture

Directors



Mr. Jack Ady
MLA
Cardston

Mr. Don Althen
Producer
Del Bonita



Mr. Norman Caukill
Producer
Caroline

Mrs. Ulla De Bruijn
Producer
Ponoka

Mr. Bill Devereux
Producer
Fort Saskatchewan
Resigned During Fiscal Year

Dr. Gordon Dorrell
Director General
Research Branch
Agriculture Canada
Ottawa

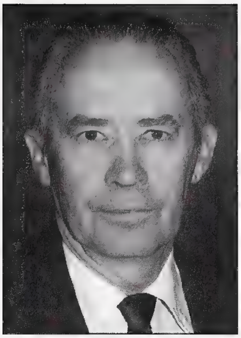
Mr. Gail Fjordbotten
Producer
Granum

Dr. Gavin Hamilton
Dean
Western College Of
Veterinary Medicine
Saskatoon

Mr. Peter Hill
Director
Research & Information Support
Alberta Advanced Education
Edmonton

Mr. Jim Hole
Producer
St. Albert

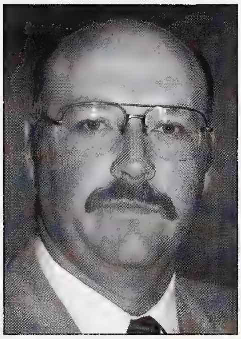
Mr. Ralph Jesperson
Producer
Spruce Grove



Mr. David Munro
Producer
Innisfail

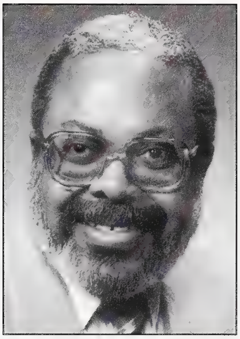
Mr. Ben Schrader
Producer
Jarvie

Mr. Gary Severtson
MLA
Innisfail



Mr. Norman Storch
Producer
Hanna

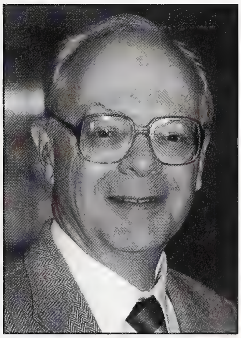
Mrs. Dolores Thornton
Producer
Calgary



Dr. Trevor Thorpe
Associate Dean (Research)
Faculty of Science
University of Calgary

Mr. Tom Towers
Producer
Red Deer

Dr. Ed Tyrchniewicz
Dean
Faculty of Agriculture
and Forestry
University of Alberta
Edmonton



Dr. Alan Vanterpool
Secretary
Premier's Council on
Science and Technology
Edmonton

Mr. Gordon Wells
President
Tradex International
Consulting Corporation
Calgary

Appendix 4: Committee Members - Alberta Agricultural Research Institute

Executive Committee

Chairman	Mr. Bob Bogle MLA, Taber-Warner
Vice-Chairman	Mr. Ben McEwen Deputy Minister Alberta Agriculture Edmonton

Members:

Dr. Ed Tyrchniewicz
University of Alberta, Edmonton

Mr. Gail Fjordbotten
Producer, Granum

Mr. Tom Towers
Producer, Red Deer

Mr. Gordon Wells
Tradex International, Calgary

Mr. Norman Storch
Producer, Hanna

Dr. Ralph Christian
AARI Executive Director, Edmonton
(non-voting)

Research Committees

Program Area	**Beef and Dairy**	**Pork, Poultry, Sheep and Other Livestock**	**Cereals and Oilseeds**
Chairman	Mr. Ben Schrader Producer, Jarvie	Mr. Bill Devereux Producer, Fort Saskatchewan	Mr. Norman Caukill Producer, Caroline
Vice-Chairman	Mr. David Munro Producer, Innisfail	Mr. Gary Severtson MLA, Innisfail	Dr. Trevor Thorpe University of Calgary, Calgary
Executive Secretary	Mr. Doug Milligan Alberta Agriculture, Calgary	Dr. Nick Nation Alberta Agriculture, Edmonton	Mr. Bob Nelson Alberta Agriculture, Lacombe
Members	Mr. John De Leeuw Alberta Milk Producers Society Carrot Creek Dr. Glen Coulter Agriculture Canada, Lethbridge Dr. Len Bauer University of Alberta, Edmonton Mr. Francis Gardner Producer, Nanton Dr. Ted Mitenko Alberta Genetics Inc., Calgary Dr. Kee Jim Feedlot Health Management Services Okotoks Dr. Eugene Janzen Western College of Veterinary Medicine Saskatoon, Saskatchewan Dr. Gary Mathison University of Alberta, Edmonton Mr. Elgar Grinde Alberta Cattle Commission, Holden	Mr. Jurgen Preugschas Alberta Pork Producers Development Corp. Mayerthorpe Dr. Al Schaefer Agriculture Canada, Lacombe Dr. Don Hamilton Western College of Veterinary Medicine Saskatoon, Saskatchewan Dr. George Foxcroft University of Alberta, Edmonton Mrs. Kathy Playdon Alberta Sheep and Wool Commission Stony Plain Mr. Norman Moore Alberta Game Grower's Association, Alder Flats Mr. Joe Smith Alberta Beekeepers Association, Manning Dr. John Feddes University of Alberta, Edmonton Mr. Don Potter Poultry Consultant, Edmonton	Mr. Kenneth Appleby Producer, Tofield Mr. Eugene Elm Producer, Hardisty Mr. Robert Graham Producer, Olds Dr. Maurice Moloney University of Calgary, Calgary Dr. Ken Richards Agriculture Canada, Lethbridge Mrs. Jacqueline Galloway Unifarm, Fort Saskatchewan Mr. Al Muchka Alberta Canola Producers Commission Acme Mr. Wayne Kriz Western Barley Growers Association Rimbey Dr. Michelle Veeman University of Alberta, Edmonton

Program Area	**Forage, Pulse, Vegetable and Other Crops**	**Resource Conservation**	**Policy, Economics and Marketing**
Chairman	Mr. Jim Hole Hole's Greenhouses and Gardens Ltd., St. Albert	Mr. Jack Ady MLA, Cardston	Mr. Ralph Jesperson Producer, Spruce Grove
Vice-Chairman	Mrs. Dolores Thornton Producer, Calgary	Mrs. Ulla De Bruijn Producer, Ponoka	Mr. Don Althen Producer, Del Bonita
Executive Secretary	Mr. Tom Krahn Alberta Agriculture, Brooks	Mr. Brent Paterson Alberta Agriculture, Lethbridge	Mr. Arnold De Leeuw Alberta Agriculture, Edmonton
Members	Mr. Ray Murphy Alberta Forage Council, Bonnyville Mr. Murray Holt Producer, Sangudo Dr. Dermot Lynch Agriculture Canada, Lethbridge Mrs. Holley Hallet Alberta Women's Institute, Carstairs Mr. Rod Bradshaw Producer, Innisfail Dr. Jane King University of Alberta, Edmonton Mr. Lud Prudek Producer, Bow Island Mr. Bob Sproule Salisbury Greenhouses, Sherwood Park	Dr. David Chanasyk University of Alberta, Edmonton Dr. Henry Janzen Agriculture Canada, Lethbridge Mr. Bill Norris Dryland Salinity Association, Warner Mr. Jean Crepin Norwest Soil Research Ltd., Edmonton Mr. Wayne Arrison Alberta Conservation Tillage Society Red Deer Mr. Roy Jensen Alberta Irrigation Projects Association, Shaughnessy Dr. James Byrne Water Research Institute University of Lethbridge, Lethbridge	Mrs. Marilyn Clarke Calgary Co-op Association, Calgary Dr. Brian Freeze Agriculture Canada, Lethbridge Mr. David Keeler Producer, Raymond Dr. Mel Lerohl University of Alberta, Edmonton Mr. Wayne Wilderman Producer, Blackie Dr. Tony Evans Norac Technologies, Edmonton Mr. Bob Balisky Producer, DeBolt Mr. Chuck Sterling Alberta Agriculture, Edmonton

Strategic Committees

Program Area	**Production Research**	**Agricultural Processing Research**	**Marketing Research**
Chairman	Mr. Gail Fjordbotten Producer, Granum	Mr. Tom Towers Producer, Red Deer	Mr. Gordon Wells Tradex International, Calgary
Executive Secretary	Mr. Don Macyk Alberta Agriculture, Edmonton	Mr. Dennis Glover Alberta Agriculture, Edmonton	Mr. Cliff Wulff Alberta Agriculture, Edmonton
Members	Dr. Keith Briggs University of Alberta, Edmonton Mr. Albert Pimm Producer, Grimshaw Dr. Mick Price University of Alberta, Edmonton Dr. Jim McElgunn Agriculture Canada, Beaverlodge Mr. Lyn Thacker Producer, Bow Island Mrs. Betty Ditzler Home Economist, Lacombe Mr. Daniel Groenenboom Producer, Kipp Dr. Terry Church Alberta Agriculture, Edmonton	Dr. Bill Ballantyne Gainers Inc., Edmonton Mr. Sandy Bibby UFL Foods Inc., Edmonton Dr. Stewart Campbell Consultant, Lethbridge Dr. Jim Pantekoek Agriculture Canada, Lacombe Mr. Stan McDougall Palm Dairies Ltd., Calgary Mr. Ray Grimson Lakeside Research Ltd., Brooks Dr. Fred Wolfe University of Alberta, Edmonton	Dr. Bernie Sonntag Agriculture Canada, Lethbridge Mr. Jack Gorr Western Canadian Wheat Growers Association, Three Hills Mr. Elden Kaun Producer, Penhold Mr. Ken Strickland KenAgra Management Services Ltd. Edmonton Dr. Bill Phillips University of Alberta, Edmonton Dr. Martin Wenkoff Canadiana Genetics Inc., Carstairs Mr. Ben Thorlakson Animal Research International, Airdrie

Program Area	**Sustainable Development and Conservation Research**
Chairman	Mr. Norman Storch Producer, Hanna
Executive Secretary	Mr. Brian Colgan Alberta Agriculture, Edmonton
Members	Dr. Bob Fessenden Alberta Research Council, Edmonton Mr. Spencer Hilton Alberta Conservation Tillage Society, Strathmore Mr. Ike Lanier Producer, Lethbridge Dr. Wayne Lindwall Agriculture Canada, Lethbridge Mr. Paul Barlott Barlott Consulting Ltd., Sherwood Park Dr. Steve Pawluk University of Alberta, Edmonton

On-Farm Demonstration Committees

Program Area	**Region 1 Committee** **Southern Alberta**	**Region II Committee** **South Central Alberta**	**Region III Committee** **North Central Alberta**
Chairman	Mr. Don Young Alberta Agriculture Lethbridge	Mr. Glen Werner Alberta Agriculture Airdrie	Mr. Alan Hall Alberta Agriculture Red Deer
Producer Members	Mr. Steve Slemko Coaldale Mr. Frank Spanbauer Barnwell Mr. Buck Spencer Nobleford Mr. Murray Market Vulcan Mr. Will Van Roessel Bow Island	Mr. Del Bates Acme Mr. Lindsay Eklund Cochrane Mr. Arthur Jaques Oyen Mr. William Noy Rosebud	Ms. Joyce Bussard Wetaskiwin Mr. Terry Crisp Monitor Mr. Ken Nelson Stettler Mr. Dale Anderson Erskine Ms. Rosemary Brown Caroline Mr. Al Chiswell Lacombe
Alberta Agriculture Staff	Mr. Gordon Frank Brooks Mr. Alan George Lethbridge Mr. Blair Shaw Lethbridge	Mr. Don Milligan Airdrie Mr. Ted Darling Airdrie Mr. Richard Smith Airdrie Mr. Larry Welsh Airdrie	Mr. Wayne Jackson Red Deer

Program Area	**Region IV Committee** **Northeast Alberta**	**Region V Committee** **Northwest Alberta**	**Region VI Committee** **Peace River Region**
Chairman	Mr. Ralph Berkan Alberta Agriculture Vermilion	*Chairman (effective August, 1991)* Mr. John Knapp Alberta Agriculture Barrhead *Acting Chairman (April-August, 1991)* Ms. Randi Sandbu Alberta Agriculture Barrhead	*Chairman (effective August, 1991)* Ms. Yvonne Grabowsky Alberta Agriculture Fairview *Chairman (April-August, 1991)* Mr. John Knapp Alberta Agriculture Fairview
Producer Members	Mr. Steve Blashko Andrew Mr. Clement Fontaine St. Paul Mr. Bruce Taylor Hardisty Mr. Robert Schacher Tofield	Mr. Dale Greig Barrhead Mr. Eric Karlzen Carrot Creek Mr. Robert Stannard Sherwood Park Mr. Gary Webber Stony Plain Mr. Fred Whitney Boyle	Mr. Alan Barnes Enilda Mr. Eugene Dextrase High Level Mr. Dave Hegland Wembley Ms. Gertie Sorenson Bezanson Mr. Tony Yelenik Valleyview Mr. Jean Bergeron St. Isidore Mr. John Reinders Deadwood
Alberta Agriculture Staff	Mr. Shane Dobson Two Hills Ms. Tennis Marx Ryley Mr. Ellis Treffry Vermilion Ms. Edith Zawadiuk Two Hills	Mr. William Chapman Barrhead Mr. Robert Winchell Barrhead Mr. Wayne Winchell Barrhead	Mr. Mike Pearson Eaglesham Mr. Mike Rudakewich Fairview Ms. Linda Hawk Spirit River

Appendix 5:

Agricultural Research Facilities in Alberta